

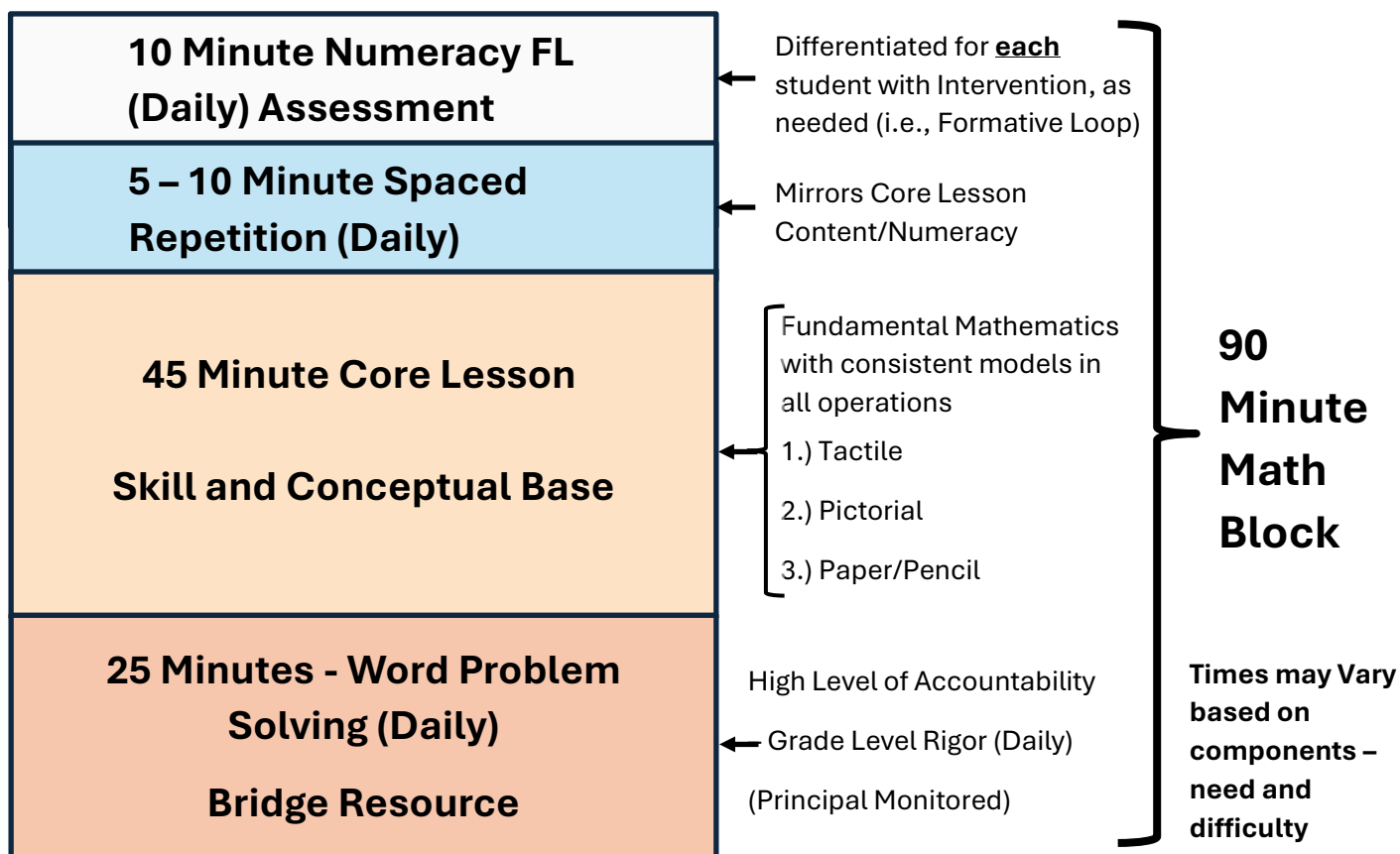
90-minute Math Block – 2024 ~ Readers’ Digest Version

Elementary Math Teachers (Grades 1 – 5)

There are FOUR (4) primary components in a 90-minute math block. These 4 components consist of a daily numeracy program, spaced repetition, core lesson and a daily problem session. Usually, 10 minutes is saved if the daily numeracy (both Math Facts and Math Processing Skills) is completed when students first arrive at school at the onset of school in their homeroom. It is important to note the daily numeracy should begin immediately in the intermediate grade levels (third through fifth grades) at the onset of the school year. However, in the primary grades, the daily numeracy program (Formative Loop) should begin 3 to 4 weeks after the start of the school year, so that classroom teachers have an opportunity to provide basic instruction to students in the core math lessons.

Students in the intermediate grades should complete 2 ~ 5-minute daily assessments (a math fact assessment and a math processing assessment). Ask Formative Loop representatives for this option – it is NOT the standard package, but the cost is the same. There is only 1~5-minute assessment in the primary grades. Formative Loop requires the students to WRITE their solutions which is key to learning into long-term memory. The program should be pressed. The white paper “*Math Facts – Easy to Do!*” can be downloaded for free at the address provided in the footer. This document affords the educator the ability to understand every aspect about student mastery of both math facts and processing skills as well as symbiotic interplay with the other components of the 90-minute math block.

The graphic shown below depicts the four (4) components of a typical 90-minute math program.



SPACED REPETITION INSTRUCTION (5-10 minutes – but can be extended)

The spaced repetition guidelines for skills each grade (first through fifth grade) can be downloaded for free at the website address provided in the footer of this document. Those documents are critical to understanding the specifics of this document. Those documents save the teacher the time and effort from creating them.

90-minute Math Block – 2024 ~ Readers’ Digest Version

The **first** reason for including spaced repetition in a daily math program is that it is the most efficient means of implementing a guided math program daily component since ALL students are engaged in the activity simultaneously. It also cuts down on the planning of the lesson since the classroom teacher is NOT required to design separate activities for students NOT serviced in the teacher’s small intervention group. The **second** reason is that students are provided sufficient THRESHOLD opportunities to master and ingrain the content. In general, talented and gifted students need only 1 to 3 repetitions, and general education students require between 8 to 18 repetitions to achieve content mastery. Students receiving special education services will require repetitions that vary greatly since the student’s disability dictates that quantity. The **last reason** is the flexibility of the instruction. A teacher can spend more time on areas that require more need, and less on those areas that are mastered. It is important to note that each student can be brought along to mastery simultaneously if the teacher monitors the students closely during the short and dynamic instructional session.

It is also important to emphasize that the classroom teacher must be organized and prepared. He or she must be dynamic and move quickly through the content, so students are not bored. Finally, the teacher should vary the instructional technique for the same reason from time to time – possibly using a previously prepared warm-up that students are given or pick-up as they enter the classroom door at the beginning of the math block. The measurement warm-ups for 4th and 5th grade are perfect for this situation, and they may be downloaded (PDF) for free on the Formative Loop Resource Page. This technique is especially effective for class rotations to engage students quickly as they enter the classroom and find their desk. It also allows the teacher a few minutes to make final preparations for class while monitoring the engagement of their students.

Demonstration points or highlights:

- Write 6 to 7 skills in the corner of the white board. After a skill is mastered by all students, replace it with a new skill. Add in skills from PREVIOUS core lessons for review until they are mastered.
- Dynamic – motivating – relational. The teacher must be ‘ON.’ ‘All the world’s a Stage, and THIS is the classroom teacher’s stage!’
- Place students that struggle with a high-low partnership and/or close to the front so they can receive real time assistance from the teacher, as needed.
- Use hand signals, white boards with dry erase markers, notebooks, heads down or hands up for visual comprehension checks on content so the teacher is aware of mastery of content and/or specific students that still require more repetitions.
- Use skills from Spaced Repetition packet (free download at website in footer – Grades 1-5), prior academic gaps and core lessons where students struggle. The short session is and should be symbiotic with the numeracy program with math facts (Doubles, Doubles Plus 1), Making 10, Multiples, and Finding the Missing Factor.
- Sessions can include long-term discrete skills - spelling of numbers in word form, compression method for factors, or individual mastery of specific skills for a difficult math processing skills (multiples, LCD, equivalent fractions, lowest terms) like adding or subtracting fractions/mixed numbers with unlike denominators.
- The previous day’s lesson can be added with a couple quick examples – always promoting mastery of concepts.
- All students should be actively engaged in writing or interacting with the teacher. The teacher is interacting with students in a ‘broad conversation’ as they move through numeracy skills and math processing skills.
- Break complicated tasks down – Learning Multiples, Compression Method for Factors, etc. Always think, **“How can I teach this skill in pieces so that it is learned in aggregate?”**
- **Get Rich Slowly** – Day by Day Progression – Consistency, Sequential Learning and Effort WINS with any human endeavor!
- The teaching philosophy of ... *“If the student GETS IT, They Get It! If not, they do not, and the teacher moves on”* results in leaving a mass of students academically behind. Using this technique and an effective daily numeracy program results in all students learning the grade level curriculum. Students will KNOW to mastery what the educator places importance and priority. They will NOT know what the educator does not.

90-minute Math Block – 2024 ~ Readers’ Digest Version

- This process, if done correctly and repeatedly, will reduce classroom management issues since all students will be able to engage in the lessons – since they are slowly but surely academically caught-up to grade level work.
- This instructional technique will promote trust and a positive relationship between the teacher and their students due to direct engagement and daily interactions.
- Finally, and importantly, the spaced repetition not only interacts symbiotically with the daily numeracy program and core lessons, it handles processes with many co-dependent skills to master such as elapsed time or adding or subtracting fractions with unlike denominators. In doing so, when a teacher reaches that content point in their content sequencing, all of the co-dependent skills have been taught to mastery and students simply put the pieces together. For instance, elapsed time: Students can make 60 minutes (from 1 minute to 60 minutes), understand the 24-hour day is divided into two (2) twelve-hour segments (AM – Antemeridian and PM – Postmeridian), and they can covert quantities of minutes over 60 minutes (e.g., 60 to 120 minutes) to equivalent hours and minutes. With all those discrete skills mastered, the teacher is simply showing a linear diagram of beginning and end points of time and summing up the quantities.

Like ALL new tasks undertaken by either children or adults, IT TAKES PRACTICE to Master. Teaching with a new instructional technique gets better with time. The teacher’s technique will significantly improve in only two to three weeks. We are giving children the skills so that they can decide on their future after high school. However, if we do not provide students with an equitable and quality education, WE DECIDE FOR THEM, unfortunately.

CORE LESSON (45 minutes)

The core lesson is (generally) a TIER 1 designed lesson since most of the prior academic numeracy gaps are easily handled in the daily numeracy program and during spaced repetition. **The core lesson is the time for GRADE LEVEL content.** However, there are several primary questions that should be addressed regarding the core lessons.

There are five points that should be addressed. Those points are summarized below.

First, where in the grade level content should the instruction begin in the sequencing? Answer: At the beginning – **PLACE VALUE**. Build the fundamentals of math. Initial lessons should focus student learning on the most fundamental aspect of the curriculum. The math data at your school indicates that is where you should begin, but the word ‘elementary’ means, by definition, FUNDAMENTAL. It is recommended to begin with Place Value and bring ALL students along for the academic ride.

Second, build sequentially!!! If the daily numeracy program and spaced repetition are used with fidelity and consistency, the TIME is there EACH DAY to do so. AGAIN, bring all students along simultaneously, so students are not left behind. Not doing so is the formula - BY DESIGN for inequitable education processes.

Third, use resources that are designed sequentially. Amara skill building resources have the practice sheets as does the Formative Loop Resource library immediately available for FREE DOWNLOAD – THERE IS NO EXTRA WORK FOR THE TEACHER. Become familiar with both resources. **Make sure teachers know what is available in Formative Loop Resource for each grade level. They do not need to be searching or paying for resources on Teacher Pay Teachers for content.**

Fourth, the initial lesson design for NEW CONCEPTS should **always** be CONCRETE, PICTORAL, PAPER PENCIL (abstract). Thus, the teacher must know what concept is new to their grade level. For example, third through fifth grade teachers should NOT be using a concrete manipulative for addition and subtraction. That concept is a primary grade concept. Use a pictorial model for those grades – a number line, for example. The primary grades will be much heavier in manipulative work daily – generally speaking – since so many new concepts are introduced in those grades. However, any NEW CONCEPT in the intermediate grades (3rd-5th grades) should begin with a manipulative

90-minute Math Block – 2024 ~ Readers’ Digest Version

approach. For instance, in third grade, teachers should start their multiplication and division instruction with a manipulative approach due to the fact that multiplication/division are first introduced at that grade level.

Fifth, lessons should be designed for structure – a consistent structure. Recommend old school – Learning objective, anticipatory set, guided practice with comprehension checks, independent practice with teacher monitoring – check student work. Comprehension checks – white boards, hand signals, raising hands, etc. Position students that require the most assistance strategically in the front of the classroom, so the teacher can assist them, as needed. **Note:** Building sequentially – at the fundamental point so chronically struggling students are brought along for the academic ride. Use these students’ understanding during the comprehension checks to determine the number of examples to show the class during the guided practice. The lack of current educators to readily include ALL students causes discipline issues as well as academic ones in the classroom. Early finishers on the independent work must be given a task – reading quietly, for example.

See Sample Math Lesson Format at the end of this packet. It is old school, but effective!

Note: Before starting the lesson, ensure that ALL students are attentive – “All eyes on me.” Also, it is IMPORTANT to include a quick review of core lessons concepts in the Spaced Repetition Session on subsequent days. The mass of students WANT to understand the material – that requires threshold repetition examples by a dynamic and relational teacher.

Note: Computer programs are not saving students – Teachers are! Build positive relationships. Students need to be engaged in sequential, accountable learning with a human being. Children desire positive feedback in the learning process. Teachers provide this – a computer program should be used sparingly. This advice is coming from a technical engineer and computer programmer. Please note that my first university degree was in civil engineering.

PROBLEM SOLVING (30 minutes)

Problem Solving is the ultimate goal in our mathematics’ classrooms. The issue is that a traditional word problem is nothing more than a series of embedded discrete math fact and math processing skills. When students do not possess those embedded skills to mastery and long-term memory, they become overwhelmed solving basic grade level problems. There are too many steps and skills to focus on for a child (and developmentally for an adult), so their brain or “CPU” becomes overwhelmed.

The task is to have a problem-solving component that is compatible and aligned with the skills that are taught in the classroom. Use the Amara problem solving resource – I provide it to teachers and parents for free. It focuses on skill concepts taught in the classroom and related problem solving in the resource.

Students should begin with paper-pencil resource work, so that teachers can set up and establish a STRUCTURED problem-solving process that can control students’ work. Then, teachers can transition in the spring semester to a computer-based format. However, the paper-pencil resource should be completed by students on a separate piece of paper to emulate the written word problem shown on a computer. For example, the student should have a page of 4-to-6-word problems daily.

Then, if the resource is spiral bound, the student works the traditional ‘word problems’ on the blank sheet to the left (i.e., the back of the previous days exercise) or a blank sheet of paper. Or a student may use a separate notebook to solve the daily ‘word’ problems. The work should be neat and logical for each problem. USE A PROBLEM SOLVING ACROYNM for each ‘word’ problem – like RACE or CUBES. In doing so, the students are consistent in their approach and the means that they analytically solve each story/word problem. Over time, that problem solving methodology will be naturally ingrained into long-term memory.

Lastly, classroom teachers should MODEL the daily problem-solving resource for a minimum of 2 to 4 weeks. Teachers should work the problems step-by-step with their students showing them – “THIS IS WHAT I WANT YOU TO

90-minute Math Block – 2024 ~ Readers’ Digest Version

DO!” When the students are completing INDEPENDENT work with a resource, the teacher should walk around – actively and monitor the resource work completed by students. The teacher can check each student’s work and place a CHECK by each problem the student works correctly. Assist each student, as needed. Of course, the teacher must work the page prior to the lesson so they are familiar with the activity.

Checking students’ work in this ACTIVE manner is highly beneficial in student learning in the following ways, despite the added work on the teacher via high levels of actively monitoring students. **First**, students solve problems faster. They are begin checked in real time. They know that there is immediate accountability in their effort. **Second**, the teacher receives immediate feedback on their students’ work. Are they getting the concepts or not? Where do I need to diagnostically spend more time? **Third**, it eliminates the need to check student work globally, and quite frequently, students do not really understand ‘the what’ and ‘the why’ that they missed the problem – or worked it incorrectly. Each student is held accountable in real time, and this process also eliminates classroom management issues. **Fifth**, the teacher must set clear expectations for early finishers with their students. For example, early finishers may read quietly until all students have completed the assignment. **Lastly**, if the problem-solving resource is bounded in a spiral, it provides the teacher with a work sample for parents and possibly evidence of a special education evaluation over time. It also provides the administrator with a resource that shows student work in the classroom over time - independently whether the administrator was physically in the classroom at the time the students completed the exercises. Thus, the quality of instruction and accountability is also on display over time. **Note:** The current medium of state testing is computer based. The students should begin paper-pencil and transition in the spring. However, if the students show their work for problems on a separate sheet of paper, it will assist them in the computer medium transition. It will emulate reading a problem on the computer and showing their work separately – neatly and logically.

It is imperative that the principal monitors the problem-solving resource throughout the year, so there is consistency in the process in ALL classrooms. Otherwise, students may be skill based ready, but NOT problem solving ready due to poor practice and accountability in the classroom. Additionally, the administration can monitor the ‘Formative Loop’ Numeracy program and determine in real time if the core lessons are effective via the math processing skills – without being in the classroom, continually. In short, when the majority of students struggle to master processing skills, it conveys that the core lessons are not as effective as they could have been.

Sample Math Lesson on following page.

90-minute Math Block – 2024 ~ Readers’ Digest Version

Daily Lesson Plan Format – Mathematics (5th Grade EXAMPLE) Date: _____
(Note: First of the Year Lesson)

Objective:

TLW master Place Value Expansion of two (2) to four (4) digit numbers – Focus on PV and V of each digit.

Anticipatory Set:

Numbers come in different sizes based on their digits – Let’s look at these numbers so we can understand the value and place value of each digit in a number.

Resources:

Amara – Grade 5 Problem Solving, English; each student has resource book,

Practice Problems (FL Resource Library; Amara Resource Guide (5th), integrative wall board – Students (White Boards and Dry Erase Markers). HW page copies for each student.

Direct Teach:

- Present 2, 3 and 4 digit numbers (with zeroes) and work – emphasize the place and value - Example $203 = 200 + 0 + 3$ (PLACE is hundreds but VALUE is 200; PLACE is tens but VALUE is 0; PLACE is ones, V=3)
- T will demonstrate the process in a whole group setting.

Guided Practice:

- Sts. Work with Teacher – working examples – answering Teacher’s Q’s
- T works examples – comprehension hinges with students – How many??

Independent Practice:

- After several repetitions, students will work independently....teacher monitors and corrects – Note Students having/experiencing difficulty.

S.R. Numeracy Skills

- **Multiples 1**
(#’s 2, 10, 5, and 3)
- **Making 10**
(#’s: 10, 9, 8, 7)
- **Halves** (#’s 2, 20; 4, 40; 6, 60; 8, 80; 10, 100; 12, etc.)
- Even/Odd’s
- **Doubles** (1, 2, 3, 4, 6, 7)
- **Vocabulary:** Sum, PV and Value, multiples

Closure:

- Globally check students’ work. Finally, quick oral check students’ understanding
- Homework that emphasizes skill sent home. Collect tomorrow after quick global check.

Problem Solving:

Use Amara Page 1 – Model for Students – Emphasize (CUBE) or (RACE)

Carefully Model – Students work with Teacher Concurrently. Carefully Set up the Process so TEACHER EXPECTATIONS ARE CLEAR to students.

Tomorrow – PV Expansion to 5-digit numbers – Emphasize PV and V of each number – Begin to Write Number and ask for PV and its Value. Then, on following days, use 6- and 7-digit numbers.

Begin spelling exercises of ‘word’ numbers – tens, hundreds, thousands, millions. – Quickly – all students spell words correctly. Spell: 1, 2, 3, 4, 5 in words – then, move to 6-10. Extra Time – Review Spaced Repetition Skills.